

What is claimed is:

1. A curable coating composition for coating an optical fiber, comprising:
a block copolymer comprising at least one hard block and at least one
soft block, wherein said hard block has a T_g greater than the T_g of the soft
5 block; and
at least one reactive monomer.
2. The composition of claim 1, wherein said hard block comprises a
thermoplastic.
- 10 3. The composition of claim 2, wherein said soft block comprises an
elastomeric soft block.
4. The composition of claim 3, wherein said elastomeric soft block
15 comprises poly(butadiene), hydrogenated polybutadiene, polyisoprene,
polyethylene/butylene, polyethylene/propylene, diol blocks or combinations
thereof.
5. The composition of claim 1, wherein said block copolymer comprises
20 thermoplastic polyurethane, styrene butadiene, EPDM, ethylene propylene
rubber, synthetic styrene butadiene rubber, styrenic block copolymers, or
combinations thereof.
6. The composition of claim 1, wherein said at least one reactive monomer
25 comprises an ethylenically unsaturated monomer.
7. The composition of claim 1, wherein said at least one reactive monomer
comprises a multi-functional monomer.
- 30 8. The composition of claim 1, wherein said at least one reactive monomer
comprises a mono-functional monomer.

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9. The composition of claim 1, wherein said at least one reactive monomer comprises vinyl ether, epoxy, acrylate, styrene, styrene blend, maleate, maleimide, or combinations thereof.

5 10. The composition of claim 9, wherein said acrylate monomer comprises lauryl acrylate, ethoxylated nonylphenol acrylate, isodecyl acrylate, iso-octyl acrylate, tridecyl acrylate, monomethoxy tripropylene glycol acrylate, ethoxylatednonylphenol acrylate, caprolactone acrylate, phenoxyethyl acrylate, phenoxyglycidyl acrylate, lauryloxyglycidyl acrylate, isobornyl acrylate,
10 tetrahydrofurfuryl acrylate, stearyl acrylate, 2-(2-ethoxyethoxy)ethyl acrylate, or combinations thereof.

11. The composition of claim 9, wherein said acrylate monomer comprises a multi-functional acrylate.

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12. The composition of claim 2, wherein said thermoplastic hard block comprises polystyrene or polymethyl methacrylate.

13. The composition of claim 2, wherein said thermoplastic hard block
20 comprises a non-chemically reactive functional group.

14. The composition of claim 1, further comprising a photoinitiator.

15. The composition of claim 14, wherein said photoinitiator comprises a
25 non-cationic photoinitiator.

16. The composition of claim 1, further comprising at least one of an adhesion promoter, antioxidant, catalyst, stabilizer, property-enhancing additive, wax, lubricant, and slip agent.

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17. The composition of claim 1, further comprising a reactive diluent.

18. The composition of claim 1, wherein a concentration of said reactive monomer comprises an amount of from about 5% by wt. to about 95% by wt.

19. The composition of claim 1, wherein a concentration of said copolymer comprises an amount of from about 5% by wt. to about 95% by wt.

20. A curable coating composition for coating an optical fiber, comprising:
a block copolymer comprising at least one hard block having a T_g greater than about 20 °C and at least one soft block having a T_g of less than about 20 °C, wherein said copolymer has a molecular weight of more than about 20,000; and
at least one reactive monomer.

21. The composition of claim 20, wherein said copolymer has a molecular weight of more than about 50,000.

22. The composition of claim 20, wherein said copolymer has a molecular weight of more than about 100,000.

23. A coated optical fiber comprising an optical fiber having at least one cured coating layer thereon comprising a first component which comprises a block copolymer comprising at least one hard block and at least one soft block, wherein said hard block has a T_g greater than the T_g of the soft block; and a second component wherein said second component comprises at least one reactive monomer.

24. The coated fiber of claim 23, wherein said at least one cured coating layer comprises a UV cured layer.

25. The coated fiber of claim 23, wherein at least a portion of said second component is chemically cross-linked to said first component.

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26. The coated fiber of claim 23, wherein said at least one hard block comprises polystyrene or polymethyl methacrylate.

27. The coated fiber of claim 23, wherein said at least one soft block
5 comprises poly(butadiene), hydrogenated polybutadiene, polyisoprene, polyethylene/butylene, polyethylene/propylene, diol blocks, or combinations thereof.

28. The coated fiber of claim 23, wherein said block copolymer comprises
10 polyurethane, styrene butadiene, EPDM, ethylene propylene rubber, synthetic styrene butadiene rubber, styrenic block copolymers, and combinations thereof.

29. The coated fiber of claim 23, wherein said second component comprises
15 vinyl ether, epoxy, acrylate, styrene, styrene blend, thiol, maleate, maleimide, trimethylolpropane-tris-3-mercaptopropionate, tert-dodecanethiol, mercapto terminated liquid polymeric epoxy curing agent, C₆ to C₁₆ saturated dithiol, hexanedithiol, decanedithiol, cyclohexane dimethanol dithiol, or combinations thereof.

30. The coated fiber of claim 23, wherein said second component comprises
20 a multi-functional acrylate.

31. The coated fiber of claim 23, wherein said at least one coating layer
25 further comprises at least one of an adhesion promoter, antioxidant, catalyst, stabilizer, property-enhancing additive, wax, lubricant, and slip agent.

32. The coated fiber of claim 23, wherein said at least one coating layer further comprises a photoinitiator.

33. The coated fiber of claim 23, wherein said at least one coating layer
30 comprises a primary coating on the optical fiber.

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34. A method for making a coated optical fiber, comprising:

providing an optical fiber;

coating the optical fiber with a polymerizable composition

comprising a polymer component comprising a block copolymer comprising at

5 least one hard block and at least one soft block, wherein said hard block has a T_g greater than the T_g of the soft block and at least one reactive monomer; and

polymerizing the composition under conditions effective to form a cured coating over the optical fiber.

10 35. The method of claim 34, wherein said at least one reactive monomer comprises vinyl ether, epoxy, acrylate, styrene, styrene blend, thiol, maleate, maleimide, or combinations thereof.

36. The method of claim 34, wherein said at least one reactive monomer
15 comprises a multi-functional monomer.

37. The method of claim 34, wherein said at least one reactive monomer comprises a mono-functional monomer.

20 38. The method of claim 34, wherein said hard block comprises a thermoplastic hard block.

39. The method of claim 34, wherein said soft block comprises an elastomeric soft block.

25 40. The method of claim 39, wherein said elastomeric soft block comprises poly(butadiene), hydrogenated polybutadiene, polyisoprene, polyethylene/butylene, polyethylene/propylene, diol blocks or combinations thereof.

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41. The method of claim 34, wherein said block copolymer comprises thermoplastic polyurethane, styrene butadiene, EPDM, ethylene propylene rubber, synthetic styrene butadiene rubber, or combinations thereof.

5 42. The method of claim 38, wherein said thermoplastic hard block comprises polystyrene or polymethyl methacrylate.

43. The method of claim 38, wherein said thermoplastic hard block comprises a non-chemically reactive functional group.

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44. The method of claim 34, further comprising coating the optical fiber with a second polymerizable composition.

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45. The method of claim 44, wherein said polymerizing comprises simultaneously polymerizing said polymerizable composition and said second polymerizable composition to form a cured dual coating over the optical fiber.

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46. The method of claim 44, further comprising polymerizing the second polymerizable composition.

47. The coated fiber of claim 23 wherein said second component comprises a reactive component.

25 48. The composition of claim 1 wherein the composition further comprises at least one additive selected from trimethylolpropane-tris-3-mercaptopropionate, tert-dodecanethiol, mercapto terminated liquid polymeric epoxy curing agent, C₆ to C₁₆ saturated dithiol, hexanedithiol, decanedithiol, cyclohexane dimethanol dithiol, and combinations thereof.

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